

FISH SURVEYS  
ON THE  
WASATCH-CACHE NATIONAL FOREST  
CONDUCTED DURING 1997

By

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## TABLE OF CONTENTS

TABLE OF CONTENTS . . . . .	i
LIST OF FIGURES . . . . .	iii
LIST OF TABLES . . . . .	iv
INTRODUCTION . . . . .	1
METHODS . . . . .	1
RESULTS . . . . .	3
Bear River Drainage . . . . .	4
High Creek . . . . .	4
Summit Creek . . . . .	5
Blacksmith Fork Drainage . . . . .	6
Spring Creek . . . . .	6
Curtis Creek . . . . .	7
Weber River . . . . .	8
Beus and Burch Creek . . . . .	8
Jordan River Drainage . . . . .	9
Little Cottonwood Creek . . . . .	9
OPPORTUNITIES AND RECOMMENDATIONS . . . . .	10
Bear River Drainage . . . . .	11
High Creek . . . . .	11
Summit Creek . . . . .	11
Logan River Drainage . . . . .	11
Spring Creek . . . . .	11
Blacksmith Fork Drainage . . . . .	12
Millville Creek . . . . .	12
Curtis Creek . . . . .	12
Weber River . . . . .	12
Beus and Burch Creeks . . . . .	12
Jordan River Drainage . . . . .	12
Little Cottonwood Creek . . . . .	12
GENERAL . . . . .	13
LITERATURE CITED . . . . .	14
APPENDIX . . . . .	15

## LIST OF FIGURES

<u>Figure</u>	<u>Page</u>
1. Length frequency of fish collected from High Creek, Cache County, Utah, in 1997. . . . .	5
2. Length frequency of fish collected from Summit Creek, Cache County, Utah in 1997. . . . .	6
3. Length frequency of brown trout collected from Spring Creek, Cache County, Utah, in 1997. . . . .	7
4. Length frequency of fish collected from Curtis Creek, Cache County, Utah, in 1997. . . . .	8
5. Length frequency of fish captured in Little Cottonwood Creek, Salt Lake County, Utah, 1997. . . . .	10

## LIST OF TABLES

<u>Table</u>	<u>Page</u>
1. Sampling location for streams surveyed for fish on the Wasatch-Cache National Forest in 1997 and township (T), range (R) and section (Sec) where sampled. . . . .	2
2. Streams surveyed on the Wasatch-Cache National Forest in 1996 and fish species found in sampling sections. . . . .	4

## INTRODUCTION

During the summer of 1997 the staff of the Wasatch-Cache National Forest, Region 4 of the Forest Service, surveyed tributaries throughout the range of the Bonneville cutthroat trout. The main purpose for conducting these surveys was to identify fish species compositions of streams on the forest. A secondary purpose was to take up to 30 cutthroat trout to determine genetic purity. Other information which was hoped could be acquired was a population estimate for fish within the stream and age class distribution of the population.

The streams, sampled (Table 1) on the Wasatch-Cache National Forest, were selected by Forest staff. Working with a Forest Service seasonal crew and Utah Division of Wildlife Resources the streams were sampled to determine species composition. Whole fish were taken and where possible a population estimate made.

## METHODS

Crews sampled at least one location on each stream surveyed. Crews consisted of two to three people. One person ran the electrofishing equipment and, depending on the individual, may also have assist in netting fish. The second person was a netter and a third person was a netter and also carried a bucket to hold captured fish. A string line or a tape measure was used to determine the ending point of the 100 M section sampled. All possible attempts were made to locate sampling sections where a crew, in future years, could relocate and resample the same stream sections.

The sample sections were approximately 100m in length and started and ended at distinguishable habitat breaks. All side channels were sampled within this length of stream section. Fish collected within the sampling section during each pass were placed in a bucket of fresh water until weight and total lengths could be determined. Fish collected for genetic analysis were handled by division staff and procedures will not be reviewed here.

Table 1. Sampling location for streams surveyed for fish on the Wasatch-Cache National Forest in 1997 and township (T), range (R) and section (Sec) where sampled.

Drainage Creek	BASIN County	Sample Location
BONNEVILLE BASIN		
BEAR RIVER		
HIGH CREEK	CACHE	T15N,R2E,Sec2
SUMMITT CREEK	CACHE	T13N,R2E,Sec10
LOGAN RIVER		
SPRING CREEK	CACHE	T11N,R2E,Sec18 T11N,R2E,Sec30
BLACKSMITH FORK		
MILLVILLE CREEK	CACHE	T11N,R1E,Sec25,26
CURTIS CREEK	CACHE	T10N,R3E,Sec13
OGDEN RIVER		
BEUS CREEK	WEBER	T6N,R1E,Sec11,12
BURCH CREEK	WEBER	T6N,R1E,Sec14
JORDAN RIVER		
LITTLE COTTONWOOD CREEK	SALT LAKE	T4S,R2-3E
S=SOUTH, N=NORTH, E=EAST, W=WEST		

A population estimate was made for each section were possible. Some populations were not estimated because the sampling assumptions were violated. The assumptions for making population estimates are: (1) equal sampling efforts, (2) the probability of capture for any individual in the population is equal, and (3) the population is closed, no movement, deaths or births occur during or between sampling efforts (White et al. 1982). The probability of capture for any individual is also suppose to be equal between passes. Riley and Fausch (1992) found that this may not always be the case. They suggest that at least three passes be done to test capture probability. In most situations only two passes were conducted because of limited money, time and other resources.

Fish populations were estimated for fish 100mm and over. The probability of capturing fish under 100mm is believed to be too low to make an accurate estimate. With electrofishing the larger the fish, the higher the probability of capture (White et al. 1982). Fish under 50mm were assumed to be age 0 fish. Fish from 51 to 100mm were believed to be age 1 fish. It is realized that in many situations, because of local environmental factors,

this generalization may not hold true.

The calculations used to make the population estimate was:

$$N = U1 / (1 - (U2/U1))$$

where

N = population estimate for the section sampled

U1 = fish captured during the first sample

U2 = fish captured during the second sample

The probability of capture (P) is estimated by using:

$$P = 1 - (U2/U1)$$

Results from calculations using this formula suggest that if more fish are captured during the second pass than the first pass, a violation of the assumptions has occurred, the population estimate is of no value. Also if no fish are captured during a second pass a capture probability of 100 has occurred and all fish in the population have theoretically been captured. An upper and lower bound was placed on the population estimate. The formula used was:

$$CI = N \pm 1.96 \sqrt{N * P * (1 - P)}$$

where:

CI = 95% confidence interval.

In some cases the lower confidence limit was below the number of fish taken from a survey reach. In such cases the lower limit was set as the number of fish, 100mm and longer of a particular species, captured from the stream section.

## RESULTS

Eight streams were surveyed, for species compositions, on the Wasatch-Cache National Forest in 1997 (Table 1). All streams contained water at the time of sampling. Millville, Beus, Burch creeks had sufficient water, but no fish were collected on forest. Burch Creek is rumored to have cutthroat trout high in the drainage. Sections of Little Cottonwood Creek contained no fish. The other streams were composed of a number of fish species (Table 2).

Table 2. Streams surveyed on the Wasatch-Cache National Forest in 1996 and fish species found in sampling sections.

Drainage Stream	Fish Species
BONNEVILLE BASIN	
BEAR RIVER	
High Creek	CUT-RBT, BRT
Summit Creek	CUT-RBT, RBT
LOGAN RIVER	
Spring Creek	BRT
BLACKSMITH FORK	
Millville Creek	NO FISH
Curtis Creek	CUT, BRT, RBT, SCU
OGDEN RIVER	
Beus Creek	RBT <sup>1</sup>
Burch Creek	RBT <sup>1</sup>
JORDAN RIVER	
Little Cottonwood Creek	RBT, BKT

CUT=CUTTHROAT TROUT, BKT=BROOK TROUT, RBT=RAINBOW TROUT,  
SCU=SCULPIN, BRT=BROWN TROUT

1. BELOW FOREST BOUNDARY

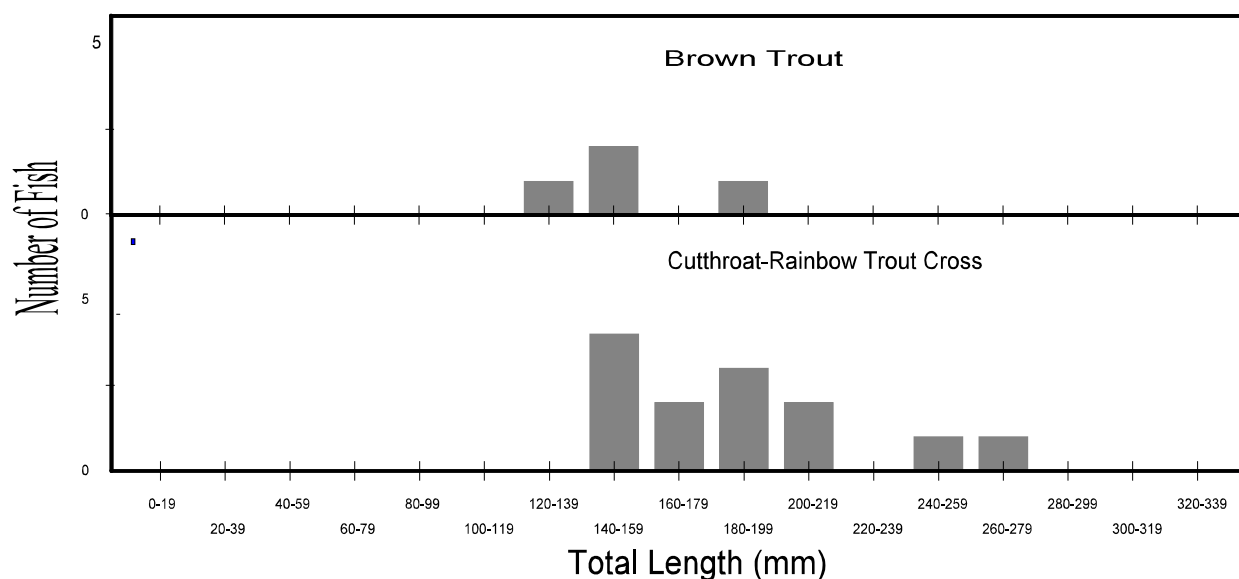
### Bear River Drainage

#### High Creek

High Creek Drainage is located just south of the Idaho Border and east of the town of Lewiston, Cache County, Utah. Only the headwaters of High Creek are found on the Wasatch-Cache National Forest. High Creek is a tributary of the Cub River, in the Bear River Drainage. The survey section started at the mouth of the North Fork of High Creek and went upstream 100 meters (M). Water temperature at the time of electrofishing the section was 12°C (54°F) at about 10:00 on the morning of 12 August 1997. The section consisted of 24% brown trout and 76% cutthroat/rainbow (cutbow) trout crosses. A total of 2 brown trout and 9 cutbows were captured during the first pass and 2 brown trout and 4 cutbow were captured during a second pass. All of the fish collected in the survey section were larger than 100mm. A population estimate for brown trout was not calculated



Figure 1. Length frequency of fish collected from High Creek,



Cache County, Utah, in 1997.

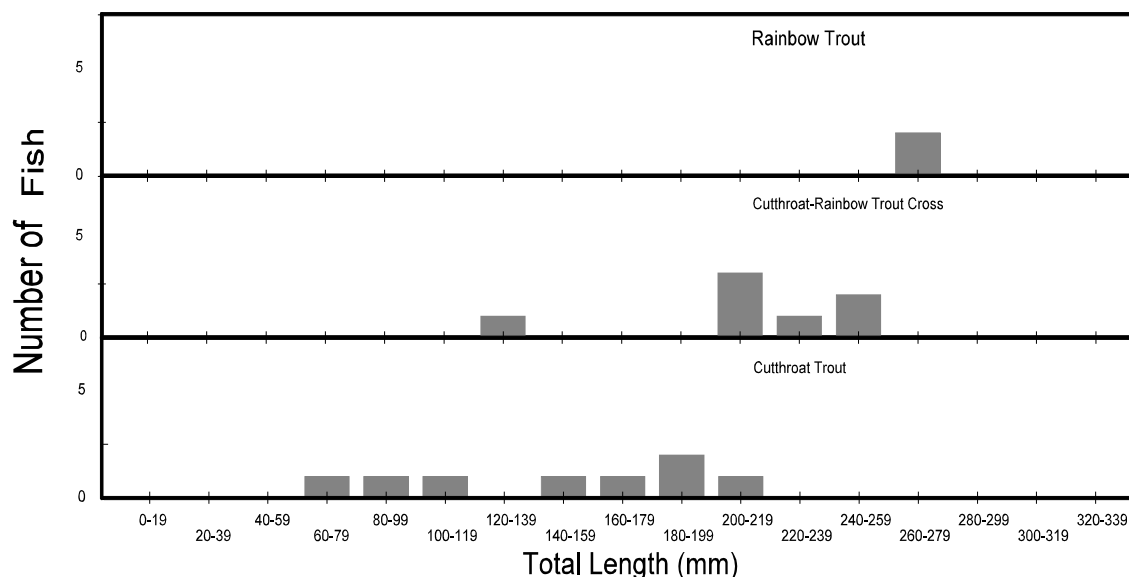
because two fish were collected each pass violating the basic assumptions of two pass samples. The total length of the brown trout captured ranged from 126 to 199mm and averaged 153.5mm (6.0in.). They weighed from 18g to 88g and averaged 40.0g (1.4oz.). The total length of the cutbow trout captured ranged from 143mm to 262mm and averaged 187.7mm (7.4in.). They weighed from 31g to 245g and averaged 107.6g (3.8oz.). The population estimate for this section, for cutbows 100mm in length and over, was 16 fish and ranged from 13 to 20. This section of High Creek consists primarily of age 3 and older fish, as distinguished by length (Figure 1).

#### Summit Creek

Summit Creek is a tributary to the Bear River and drains through the town of Smithfield in Cache County, Utah. The survey section started close to the wilderness boundary at an unpaved road crossing without a culvert. The section was 105M in length. Water temperature at the time of electrofishing the section was 8.0°C (46°F) at about 2:00 in the afternoon of 23 September 1997. The section consisted of 47% (n=8) cutthroat trout, 41% (n=7) cutbow trout and 12% (n=2) rainbow trout. All of these fish with the exception of one cutthroat were captured during the first pass. The total length of the cutthroat trout captured ranged

from 67 to 212mm and averaged 146.1mm (5.8in.). They weighed from 3g to 99g and averaged 44.9g (1.6oz.). The population estimate for cutthroat trout, greater than 100mm, in this section was 6. The total length of the cutbow trout captured ranged from 120 to 242mm and averaged 209.3mm (8.2in.). Their weight ranged from 24g to 207g and averaged 125.3g (4.4oz.). The population estimate for cutbow trout was 7 fish. The rainbow trout ranged from 271 to 279mm and averaged 275.0mm (10.8in.). They weighed from 282 to 300g and averaged 291.0g (10.3oz.). The population estimate for rainbow trout over 100mm for this section was 2 fish.

Figure 2. Length frequency of fish collected from Summit Creek,



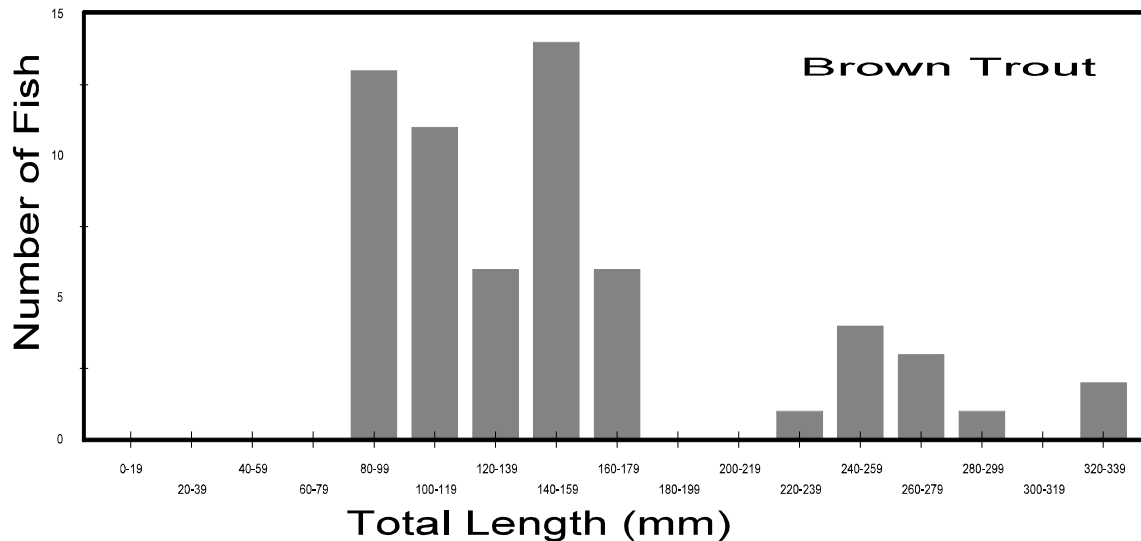
Cache County, Utah in 1997.

## Spring Creek

Spring Creek, a tributary to the Logan River, just east of Providence, Cache County, Utah. The survey section started where approximately six springs join together, below the old gravel pit, and goes downstream 50m. Water temperature at the time of electrofishing the section was 5°C (41°F) at about 10:30 on the morning of 23 September 1997. Brown trout were the only species found in the survey reach. The total length of the brown trout captured ranged from 82 to 335mm and averaged 150.7mm (5.9in.). They weighed from 5.0g to 421g and averaged 55.7g (2.0oz.). The

brown trout population estimate, for fish 100mm and larger, was 56 fish and ranged from 49 to 63 fish.

Figure 3. Length frequency of brown trout collected from Spring Creek, Cache County, Utah, in 1997.



#### Blacksmith Fork Drainage

##### Curtis Creek

Curtis Creek is a tributary of the Blacksmith Fork River, just east of Hyrum, Cache County, Utah. The survey section started at the mouth of Dry Curtis Creek and went upstream 100m. Water temperature at the time of electrofishing the section was 8°C(46°F) at about 11:30 on the morning of 13 August 1997. Species composition consisted of cutthroat (46%, n=11), brown (42%, n=10), and stocked rainbow (8%,n=2) trout and sculpin (4%, n=1). Additional cutthroat, brown and rainbow were captures just downstream of the survey reach.

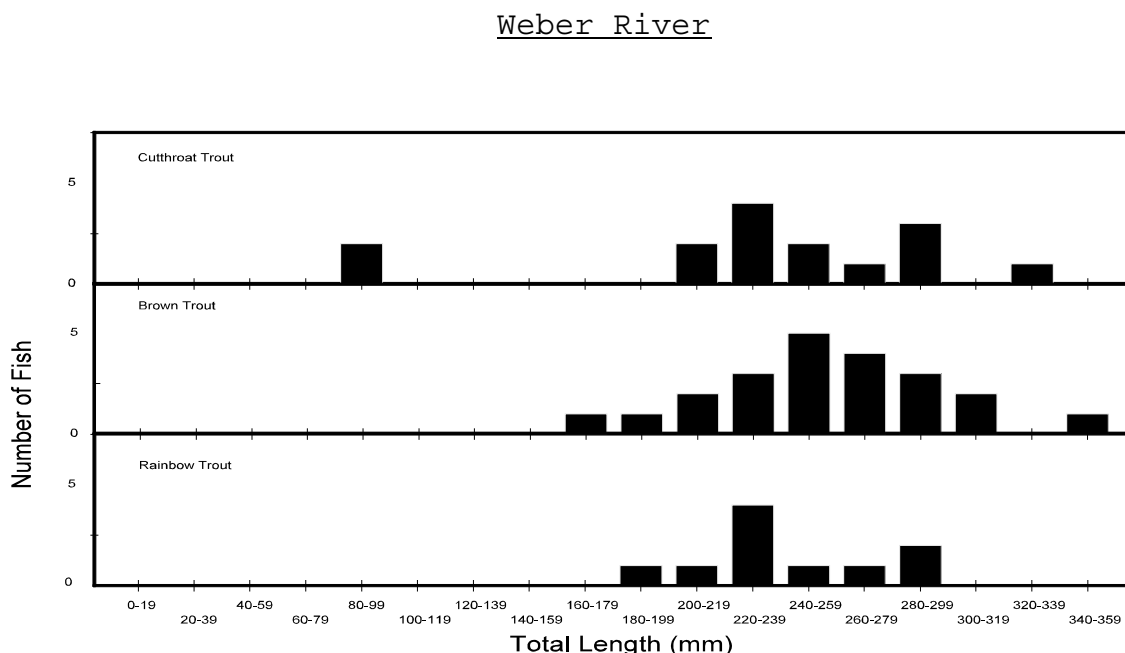
The total length of the cutthroat trout captured ranged from 92 to 320mm and averaged 233mm (9.2in.). They weighed from 9g to 286g and averaged 169g (6.0oz.). The cutthroat trout population estimate, for fish 100mm and larger, was 9 fish and ranged from 9 to 11 fish.

The total length of the brown trout captured ranged from 164 to 343mm and averaged 257mm (10.1in.). They weighed from 58g to 452g and averaged 213g (7.5oz.). The brown trout population

estimate, for fish 100mm and larger, was 11 fish and ranged from 10 to 13 fish.

The total length of the rainbow trout captured ranged from 192 to 285mm and averaged 244mm (9.6in.). They weighed from 102g to 301g and averaged 190g (6.7oz.). The rainbow trout population estimate, for fish 100mm and larger, was 2 fish with no fish being captured during the second pass.

Figure 4. Length frequency of fish collected from Curtis Creek, Cache County, Utah, in 1997.



### Beus and Burch Creeks

Beus and Burch creeks are tributaries of the lower Weber River, Weber County, Utah. The survey sections started at the Ridgedale Drive road crossing going upstream 100m. In both cases one rainbow trout was captured. No other fish were seen or captured. It is rumored that cutthroat trout have been caught by anglers in upper Burch Creek.

### Jordan River Drainage

#### Little Cottonwood Creek

Little Cottonwood Creek is a tributary to the Jordan River.

Seven survey sections were sampled in 1997. Seven different sections were selected because of water quality concerns.

Section one was located at the upstream power plant just below the first closure gate in the canyon. The reach starts at a diversion dam and goes upstream 85.5m. Water temperature at the time of electrofishing the section was 9°C (48°F) at about 9:00 in the morning of 4 August 1997. Species composition in this section consisted of one rainbow trout with a length of 221mm and a weight of 136g, after two electrofishing passes. The fish appeared to be natural in review of its fins and their condition.

Section two was located approximately 1.5 miles downstream of the Tanner Flat Campground. The section length was 100m in length. In this section only rainbow trout were collected. These fish had large side spotting and light yellow slashes under each branch under the jaw suggest that some of these fish may be offspring of rainbow and cutthroat trout crosses. The rainbow trout ranged in size from 144 to 235mm and averaged 198.7mm (7.8 inches). They weighted 30 to 145g and averaged 68.5g (2.4oz). The population estimate for rainbow trout, 100mm and over, in the section was 8 and ranged from 7 to 11 fish.

Section three was located just down from the most downstream picnic site going upstream for 92m. In this section seven rainbow and one brook trout were collected. The rainbow trout ranged in length from 120 to 275mm and averaged 239.9mm (9.4in.) They weighted 21 to 190g and averaged 153.0g (5.4oz). The population estimate for rainbow trout, 100mm and over, in the section was 7 with no fish being collected during the second pass. The one brook trout collected was 193mm in length and 82g.

Section four was located just below the Baby Thunder Chair lift. The section length was 104.5m. Two rainbow trout were captured with one being 165mm long and had a weight of 63 g and the other fish being 212mm long and had a weight of 132g.

Section Five was located just above the lower parking lot and started at a bridge crossing and goes upstream 94.4m upstream. In this section only rainbow trout were collected. The rainbow trout ranged in size from 202 to 317mm and averaged 250.8mm (10.2 inches). They weighted 118 to 347g and averaged 216.3g (7.6oz). The population estimate for rainbow trout, 100mm and over, in the section was 9 and ranged from 9 to 11 fish.

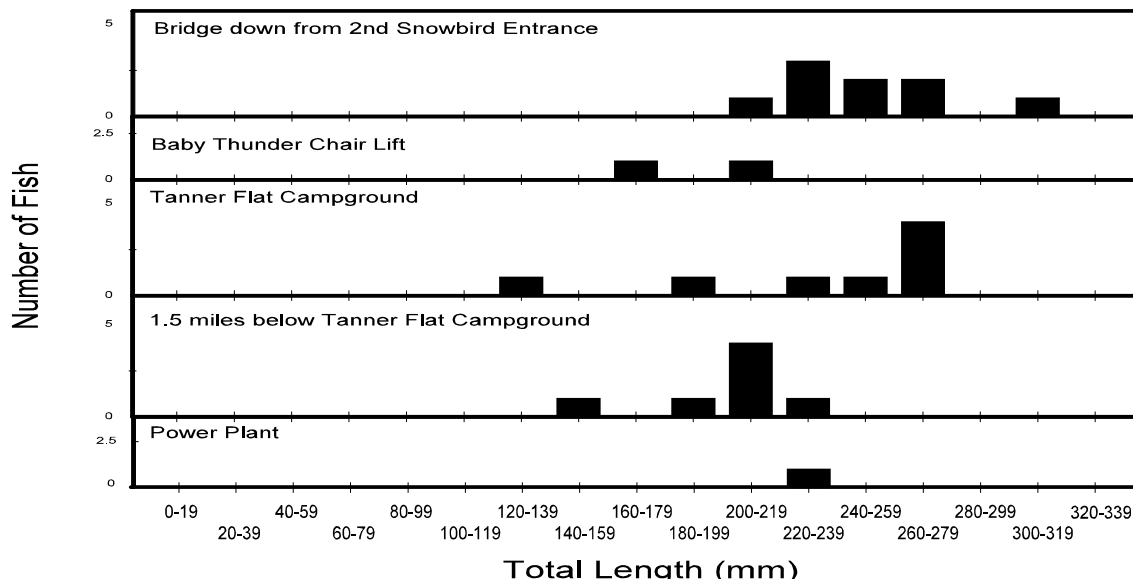
Section Six started at the Wasatch Drain Tunnel and went upstream 117.8m. No fish were collected in this section.

Section Seven ran from the bottom end of the culvert of the Sugarloaf Lift of the Alta Ski Resort and went downstream to the base of the Albion Lift. No fish were collected in this reach.

A 15-foot falls was also found within the reach which would prevent upstream passage into the upper half of the reach.

## OPPORTUNITIES AND RECOMMENDATIONS

Opportunities mean many different things to different people. In this report, I have viewed opportunities from a fish management perspective. Ecosystem management principles would



suggest that we manage for all resources so as to not lose any one part. In this report I have dealt with mainly fish issues or Figure 5. Length frequency of fish captured in Little Cottonwood Creek, Salt Lake County, Utah, 1997.

habitat issues which were obvious at a glance. No habitat surveys were conducted to identify specific habitat projects which could be implemented to improve fish habitat.

Eight streams were surveyed on the Wasatch-Cache National Forest in 1997 (Table 1). All streams contained water at the time of sampling. Millville Creek had enough water to support fish but no fish were located during the survey. The other streams were composed of a number of fish species (Table 2).

## Bear River Drainage

### High Creek

High Creek will require future investigation. Populations of pure cutthroat may be located further upstream in the drainage. The presence of brown and cutbow trout suggest that stocking has taken place in the drainage. The size of the brown trout suggests that they may be a new invader to the area.

Other management activities are also of concern in the drainage. Grazing is a concern to some of the public in the upper drainage. Dispersed recreation impacts were observed while surveying also. This was in the form of trash left at camp sites, within 2 meters of the stream, and also found in the stream.

### Summit Creek

Summit Creek has the potential to be a cutthroat trout fishery. It currently has had rainbow trout stocked in the stream. Surveys conducted in 1973 by UDWR suggest that only cutthroat trout were collected. This suggests that over the past 20 years rainbow trout have been stocked and are interbreeding with the cutthroat trout native to the drainage. Analysis of the cutthroat trout collected in the drainage needs to be completed to verify their purity. A survey of fish further up the drainage also needs to be conducted to see if pure populations exist upstream. If pure fish are found, the opportunity exists to restore native fish to the drainage.

## Logan River Drainage

### Spring Creek

Spring Creek is tapped as a water source for the town of Providence, Cache County, Utah. The opportunity exists to maintain the stream as a resident trout fishery. Access is very good along the stream. No cutthroat trout were found during the survey. This is not to say that Bonneville cutthroat trout could not be stocked back into the drainage.

## Blacksmith Fork Drainage

### Millville Creek

The only enhancement opportunity identified for the

Millville Creek drainage would be to correct road problems associated with a steep canyon access road.

#### Curtis Creek

Cutthroat trout from Curtis Creek need to be analyzed for purity. If the fish are found to be pure, removal of non-native fish would be beneficial. There exists at least two populations of cutthroat trout in the Blacksmith Fork Drainage, these being Rock and Curtis Creek. Dispersed recreation use also appears to be impacting fish habitat. This dispersed camping is occurring off National Forest Lands.

### Weber River

#### Beus and Burch Creeks

Beus and Burch creeks are tributaries of the lower Weber River, Weber County, Utah. The survey sections started at the Ridgedale Drive road crossing going upstream 100m. In both cases one rainbow trout was captured. No other fish were seen or captured. It is rumored that cutthroat trout have been caught by anglers in upper Burch Creek. Additional surveys in upper Burch Creek should be conducted to verify this report.

### Jordan River Drainage

#### Little Cottonwood Creek

Little Cottonwood Creek is a tributary to the Jordan River. Seven survey sections were sampled in 1997. The concerns over water quality appear to be justified. Fish densities appear to be generally depressed and vary greatly based on location.

### **GENERAL**

Over the past four years the majority of the streams on the Wasatch-Cache National Forest, in the historic range of the Bonneville cutthroat trout, have been surveyed for species composition. Staff of Wasatch-Cache National Forest and Utah Division of Wildlife Resources have surveyed 105 streams in the historic range of the Bonneville cutthroat trout on the Wasatch-Cache National Forest. Sixteen additional streams have yet to be surveyed, with most of these being small steep headwater streams



along the Wasatch Front. Of the streams surveyed, 15 were fishless. Of the 90 streams containing fish, 10 (or 11%) contained only nonnative trout, 44 (or 49%) contain a mix of cutthroat and nonnative trout, and 36 (40%) contain cutthroat trout (Cowley 1995, Cowley 1996, Cowley 1997). It should be remembered that merely because cutthroat trout were collected this does not suggest that these fish are pure Bonneville cutthroat trout. The cutthroat trout collected may be pure Bonneville, pure Yellowstone or a mix of Bonneville and Yellowstone, Colorado or rainbow trout. At first glance one may say that native fish are not of concern. However, when one considers that nonnative fish are present in more than 60% of the streams surveyed and full replacement has occurred in 11% of the stream, nonnative trout should be recognized as a real threat. Land management activities also threaten cutthroat trout populations. These may include bank trampling of livestock and people, improper timber harvest, poor road construction and maintenance techniques. Recreation activities also threaten native populations which include fishing, camping, site seeing and four-wheeling. Efforts need to be made to better balance society needs and yet maintain these unique fish.

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## APPENDIX